



A LEADING POLYTECHNIC  
COMMITTED TO STUDENT SUCCESS

# Chemical Technology

PLAR (Prior Learning Assessment and Recognition)



Candidate Guide

A LEADING POLYTECHNIC COMMITTED TO STUDENT SUCCESS

[www.nait.ca](http://www.nait.ca)



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## Acknowledgements

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The Chemical Technology is dedicated to removing barriers and broadening the access to programs at NAIT. NAIT recognizes that knowledge and skills are gained through a variety of processes including life and work experiences that may align with courses within our programs. We are committed to supporting a community in which learners will receive appropriate credit or recognition for prior learning.

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<b>Revised</b>				
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## Table of Contents

Why consider a PLAR assessment? .....	4
What are the PLAR options? .....	4
How many courses can be challenged through PLAR in the Chemical Technology program?.....	5
Is PLAR available at any time of the year? .....	5
Which courses are PLAR ready?.....	6
Is it easier to challenge a course through PLAR – OR – take the course?.....	7
Methods of assessing prior learning .....	7
If I live out of town, do I have to travel to the NAIT main campus to do PLAR? .....	7
What services or resources can I access if I have a disability? .....	8
Are there other methods to gain NAIT course credits for prior learning? .....	8
What are the implications of receiving PLAR or Transfer Credit for my full time student status? .....	8
The PLAR Process .....	9
Guiding principles for developing a PLAR evidence file.....	10
Types of evidence .....	10
How long will it take to prepare evidence for PLAR? .....	11
Steps to complete a self-audit .....	11
Self-audit Guide(s) .....	12
CHEM1121 – Safety and Techniques.....	12
CHEM1132 – General Chemistry .....	15
PMGT2390B – Project Management .....	20
Appendix A: Title Page .....	22
Appendix B: Employer Validation Letter.....	23
Appendix C: Evidence Binder Cover Page .....	24



## Why consider a PLAR assessment?

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*Recognition of Prior Learning (RPL)* refers to the combination of flexible ways of evaluating peoples' lifelong learning, both formal and informal against a set of established standards. You can receive academic credit for your relevant lifelong learning. The Chemical Technology program recognizes prior learning in a number of ways.

We recognize:

- Previous formal learning from a recognized post-secondary institution through transfer of credit and credential recognition.
- Previous non-formal and in-formal learning through a comprehensive prior learning assessment and recognition process (PLAR).

## What are the PLAR options?

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To be eligible for PLAR, a candidate must have first applied and have been accepted to a NAIT credit program (the non-refundable tuition deposit has been paid). Open Studies students are **not** eligible to apply for PLAR. Please note that your PLAR request will be reviewed within 6 weeks of receipt of the PLAR application form, all supporting documents (in English) and verification of fee payment. Submit your PLAR request early!

### Individual Course Challenge

If you have recent successful experience (i.e. within last 7 years) in the chemical laboratory field, and have learned the skills and knowledge for **one or more** of the Chemical Technology courses, you may apply to be assessed for each applicable course. Please note that NAIT has a 50% residency criterion. Applicants can only receive credit for up to 50% of any NAIT credit program (See [NAIT Academic Regulations and Procedures](#) under **Residence Requirements**). Students should enrol in their courses until official confirmation has been received that credit was granted.

### Fees:

- The PLAR evaluation fee is \$150.00 **per** course challenge.
- The course assessment fees must be paid prior to submitting a PLAR request.
- All fees are non-refundable.
- Call NAIT and ask to speak to an Advising Centre Representative at 780-471-6248 or Toll Free at 1-877-333-6248 or [AskNAIT@nait.ca](mailto:AskNAIT@nait.ca)



## How many courses can be challenged through PLAR in the Chemical Technology program?

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Currently we have 3 out of 20 diploma courses with PLAR challenges available. Credit is granted per course – partial credit will not be granted. Please note that NAIT has a 50% residency criterion. Applicants can only receive credit for up to 50% of any NAIT credit program. (See [NAIT Academic Regulations and Procedures](#) under **Residence Requirements**)

## Is PLAR available at any time of the year?

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Contact the program at [cht@nait.ca](mailto:cht@nait.ca) or 780-471-8933 for more details. Your request will be reviewed within 6 weeks of receipt of the request form, all supporting documents (in English) and verification of fee payment. Submit your PLAR request early!

**Please Note:** You should enrol in your courses until official confirmation has been received that credit was granted. The program sends an email notification that the application has been processed.

**It is the student's responsibility to:**

- Contact the program area with any questions or concerns related to the assessment results. [Appeal process](#) available.
- Notify the program if they have decided to decline a course credit that has been granted. Any changes must be requested before the [add/drop deadline](#).



## Which courses are PLAR ready?

Chemical Technology Program Profile			
COURSE CODE	COURSE NAME	PLAR Challenge(s) available through program	PLAR Challenge(s) not available
CHEM1121	Safety and Techniques	✓	
CHEM1131	Chemical Principles		X
CHEM1132	General Chemistry	✓	
CHEM1151	Introductory Organic Chemistry		X
MATH1148	Technical Mathematics, Statistics and Computer Applications		X
CHEM1232	Quantitative Analysis		X
CHEM1252	Intermediate Organic Chemistry		X
CHEM1280	Physical Chemistry		X
ENGL1219	Effective Communications		X
PHYS1212	Physics Fundamentals		X
CHEM2333	Industrial Chemistry		X
CHEM2341	Oil, Gas and Coal Chemistry		X
CHEM2355	Biochemistry		X
CHEM2361	Chromatography		X
CHEM2362	Molecular Spectroscopy		X
PMGT2390A	Project Management		X
CHEM2457	Food Analysis and Applied Biochemistry		X
CHEM2463	Atomic Spectroscopy and Electroanalytical Chemistry		X
CHEM2464	Advanced Applications of Instrumental Analysis		X
CHEM2471	Environmental Chemistry		X
PMGT2390B	Project Management	✓	

For assistance contact NAIT and ask to speak to an Advising Centre Representative at 780-471-6248 (Toll Free: 1-877-333-6248) or [askNAIT@nait.ca](mailto:askNAIT@nait.ca)



## Is it easier to challenge a course through PLAR – OR – take the course?

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Neither is easier. By using PLAR you may reduce the repetition of studying information that you already know. The PLAR process allows you to demonstrate knowledge you already have.

PLAR is not an easy way to certification, rather a “different” way to obtain certification. Your personal level of skill and experience will dictate which courses you choose to challenge. The self-audit section found later in this guide will help you to decide if you have a good match of skill and knowledge for a specific course.

## Methods of assessing prior learning

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Assessment methods measure an individual’s learning against course learning outcomes. The assessment methods listed below are the ones most commonly used, but other forms of flexible assessment may be considered. These assessments may include one or a combination of the following assessment tools:

- Product validation and assessment
- Challenge exam
- Performance evaluations (e.g. skill demonstrations)
- Interviews and oral exams
- Equivalency (evaluations of learning from non-credit training providers)
- Evidence or personal documentation files (providing evidence of learning from life and work experiences and accomplishments)

## If I live out of town, do I have to travel to the NAIT main campus to do PLAR?

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Depending on the mode of assessment, there may be times that you will need to meet with the program on campus. However, we will try to keep travel to a minimum.



## What services or resources can I access if I have a disability?

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Identify any possible needs related to your disability during your PLAR Audit meeting with the program. If you have a disability and want to know more about what services or resources you may be able to access for your PLAR assessment, please contact [Services for Students with Disabilities](#).

## Are there other methods to gain NAIT course credits for prior learning?

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### Transfer Credit and Credential Recognition

Yes, NAIT may grant credit for previous post-secondary training from a recognized institution that is similar in content, objectives, and evaluation standards to NAIT training. Transfer of credit is different from the PLAR process. Transfer credit and credential recognition guidelines may be found at:

<http://www.nait.ca/86612.htm>

**Please Note:** This process should be completed prior to your PLAR challenge. If these credits cannot be used for transfer credit or credential recognition, you may be able to use these accredited courses as part of your evidence for your PLAR challenge.

If more information is required, please contact:

- A NAIT Advising Centre Representative at 780-471-6248 (Toll Free: 1-877-333-6248) or email [AskNAIT@nait.ca](mailto:AskNAIT@nait.ca)
- Program Advanced Credit contact ([www.nait.ca](http://www.nait.ca) under programs & courses and contacts)

## What are the implications of receiving PLAR or Transfer Credit for my full time student status?

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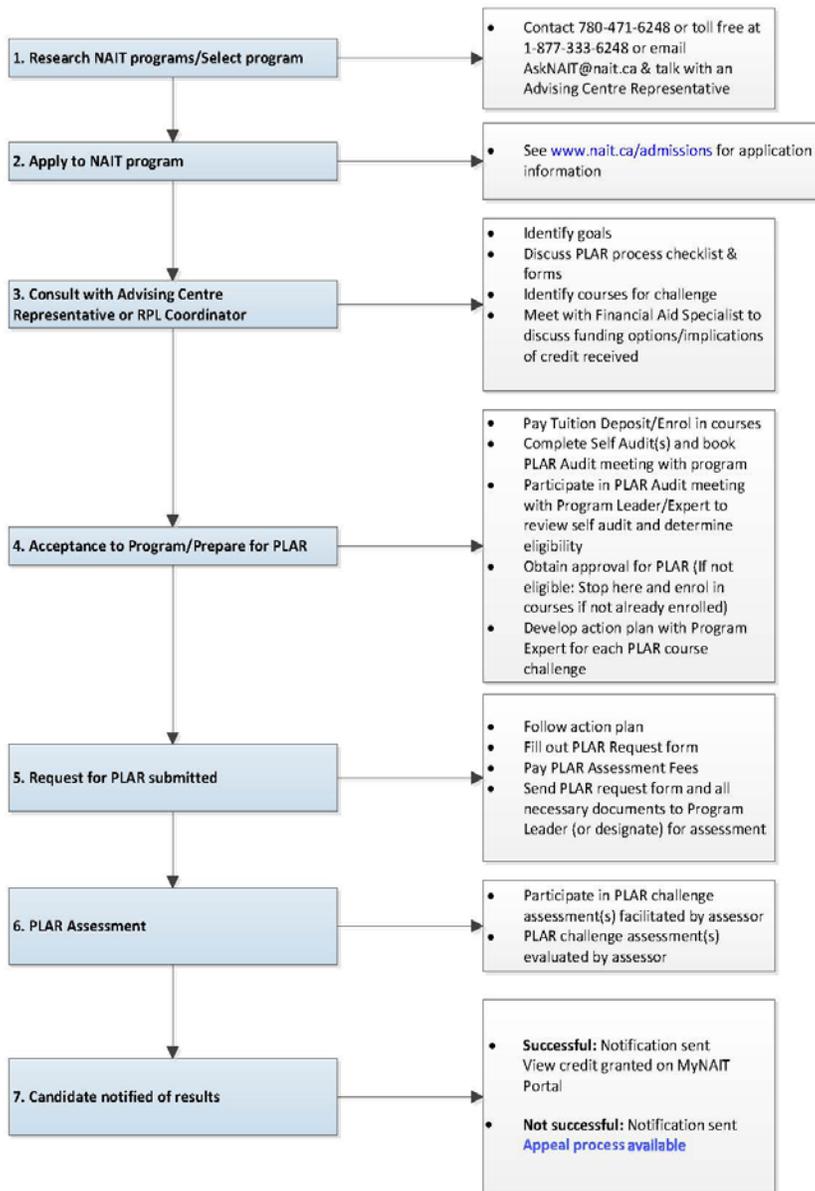
While RPL can mean fewer classes to take and pay for, students should be aware that the definition of full-time status for Financial Aid may be different than NAIT's definition of full-time status. Questions regarding financial assistance should be directed to the [NAIT Financial Aid Office](#). A student who qualifies for advanced credit should review the [NAIT Academic Regulations and Procedures](#), Academic Honors and if necessary, seek further consultation with Advising or Program staff since eligibility for semester honors, Dean's Honor Roll, an honors diploma/certificate or awards may be affected.



## The PLAR Process

### Prior Learning Assessment & Recognition (PLAR) Process

PLAR is the process of identifying, assessing, and recognizing skills and knowledge acquired through non-formal and informal learning for a specific goal such as advanced credit.



Revised January 5, 2015



## Guiding principles for developing a PLAR evidence file

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1. As you begin the PLAR process you will be advised if any evidence is required. This will be identified in your action plan. Check with the PLAR designated contact (see program home page Advanced Credit Contact) for your program **before** you begin to gather evidence.
2. Evidence must be valid and relevant. Your evidence must match the learning outcomes identified for each course.
  - It is your responsibility to create, collect and compile relevant evidence – if required.
3. Learning must be current (within the last 7 years).
4. The evidence should demonstrate the skills and knowledge from your experiences.
5. The learning must have both a theoretical and practical component.

### Types of evidence

There are three types of evidence used to support your PLAR request:

1. Direct evidence – what you can demonstrate for yourself.
2. Indirect evidence – what others say or observe about you.
3. Self-evidence – what you say about your knowledge and experience.

Ensure that you provide full evidence to your Chemical Technology PLAR assessor so that your prior learning application is assessed appropriately. Well organized, easy to track evidence will also ensure that none of the evidence is missed or assessed incorrectly.

Here are some examples of evidence that you may be requested to submit as part of your evidence file (if required):

- personal resume
- written descriptions and analysis
- experience (activity) outlines
- workplace validations
- work samples

All documents that are submitted to NAIT may be returned to the student after the final results have been given and the advanced credit appeal deadline of 10 days has passed. A copy of transcripts and certificates may be included in your evidence file, but original transcripts that were submitted at the time of application to NAIT will be available online. Be prepared to show original parchments at the PLAR audit meeting for validation.



## How long will it take to prepare evidence for PLAR?

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Since the requirements are different for each course, and each candidate has different experiences, the amount of time it takes to prepare your evidence will vary.

### Steps to complete a self-audit

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1. Read through the levels of competence as listed below.

**Mastery:** I am able to demonstrate the learning outcome well enough to teach it to someone else.

**Competent:** I can work independently to apply the learning outcome.

**Functional:** I need some assistance in using the outcome.

**Learning:** I am developing skills and knowledge for this area.

**None:** I have no experience with the outcome.

#### Learning outcomes

For each learning outcome listed, please self-evaluate your competency levels and record in the appropriate column for each self-audit.

2. Take a few minutes and read through the following self-audit for each course you are interested in as a PLAR candidate.
3. Check your level of competence as you read through each of the learning outcomes for each course. The information will help you in your decision to continue with your PLAR application.
4. In order to be successful in a PLAR assessment, your abilities must be at the competent or mastery level for the majority of the learning outcomes (**at least 80%**). Some things to consider when determining your level of competence are:
  - How do I currently use this outcome?
  - What previous training have I had in this outcome: workshops, courses, on-the-job?
  - What personal development or volunteer experience do I have in this area?

Be prepared to explain the reason you chose this level if asked by an assessor.

5. Bring the completed self-audit to a consultation meeting with the program head or faculty member in **Step 4** – of *The PLAR Process* for prior learning assessment. Select [Program Advanced Credit Contact \(PLAR\)](#) to book consultation.



## Self-audit Guide(s)

### CHEM1121 – Safety and Techniques

Laboratory safety including the safe handling of laboratory chemicals with reference to WHMIS is emphasized. Characteristic laboratory hazards are identified and precautions for flammable, toxic and corrosive materials, compressed gases, and insidious substances are described. Appropriate personal protective equipment is discussed. In laboratory, students are taught frequently used laboratory skills including laboratory documents, weighing, pipetting, filtration, solution preparation, titration, and glassware cleaning and maintenance. The importance of calibration curves, control charts and the determination of determinate and indeterminate errors are emphasized.

**Credit unit(s):** 3.00

**Equivalent course(s):** none

**Prerequisite(s):** none

<b>CHEM1121 Safety and Techniques</b>					
<b>Mastery:</b> I am able to demonstrate it well enough to teach it to someone else.					
<b>Competent:</b> I can work independently to apply the outcome.					
<b>Functional:</b> I need some assistance in using the outcome.					
<b>Learning:</b> I am developing skills and knowledge for this area.					
<b>None:</b> I have no experience with the outcome.					
	<b>Mastery</b>	<b>Competent</b>	<b>Functional</b>	<b>Learning</b>	<b>None</b>
1. Implement elements of the Alberta Occupational Health and Safety Act and Workplace Hazardous Materials Information System.					
<ul style="list-style-type: none"> <li>Recognize the various aspects of precautionary labeling including WHMIS and TDG symbols</li> </ul>					
<ul style="list-style-type: none"> <li>Identify the different types of personal protective equipment available</li> </ul>					
<ul style="list-style-type: none"> <li>Explain regulations pertaining to various types of labels and Occupational Exposure Limits</li> </ul>					
2. Evaluate workplace hazards and risks when working with flammable materials, corrosive/reactive/toxic materials and compressed gases and recognize the potential for insidious hazards					
<ul style="list-style-type: none"> <li>Apply safety rules for the chemical laboratory, and identify and select a chemical used in the laboratory by reading its label.</li> </ul>					
<ul style="list-style-type: none"> <li>Explain how to handle flammable solvents to prevent fires.</li> </ul>					
<ul style="list-style-type: none"> <li>Explain how to work safely with corrosive chemicals.</li> </ul>					
<ul style="list-style-type: none"> <li>Explain the different types of hazards of toxic chemicals and how to monitor and protect oneself from these hazards.</li> </ul>					
<ul style="list-style-type: none"> <li>Discuss various aspects of compressed gas use, including properties, hazards, precautions, storage and rules for handling</li> </ul>					



<b>CHEM1121 Safety and Techniques</b>					
<b>Mastery:</b> I am able to demonstrate it well enough to teach it to someone else.					
<b>Competent:</b> I can work independently to apply the outcome.					
<b>Functional:</b> I need some assistance in using the outcome.					
<b>Learning:</b> I am developing skills and knowledge for this area.					
<b>None:</b> I have no experience with the outcome.					
	<b>Mastery</b>	<b>Competent</b>	<b>Functional</b>	<b>Learning</b>	<b>None</b>
<ul style="list-style-type: none"> <li>Identify and apply the precautionary measures that must be taken when handling each of the six categories of reactive chemicals.</li> </ul>					
<ul style="list-style-type: none"> <li>Identify and apply some control measures for working around insidious hazards in the chemical laboratory</li> </ul>					
3. Use laboratory glassware and equipment based on standard laboratory practices.					
<ul style="list-style-type: none"> <li>Select the appropriate glassware or laboratory equipment required for a desired task.</li> </ul>					
<ul style="list-style-type: none"> <li>Perform acid/base titrations using proper techniques.</li> </ul>					
<ul style="list-style-type: none"> <li>Use proper technique when using a volumetric pipet and a buret.</li> </ul>					
<ul style="list-style-type: none"> <li>Operate an analytical balance.</li> </ul>					
4. Prepare solutions and samples for wet chemical analysis.					
<ul style="list-style-type: none"> <li>Dissolve solids using proper techniques and methods.</li> </ul>					
<ul style="list-style-type: none"> <li>Prepare a standard solution by performing all necessary calculations and using appropriate techniques.</li> </ul>					
<ul style="list-style-type: none"> <li>Prepare dilutions from a stock solution.</li> </ul>					

### PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

#### A. Laboratory demonstration

The PLAR candidate will successfully complete (50% or higher) a 60-min laboratory demonstration assessing learning outcomes 3-5.

- The PLAR candidate will perform standard laboratory techniques, specifically weighing, quantitative transfer, solution preparation, and pipetting, to prepare a stock solution and a series of standards of specified concentrations.
- The candidate will perform an acid-base titration.
- The demonstration will be administered in a Chemical Technology laboratory by authorized evaluators (panel of instructors) who will evaluate the PLAR candidate and communicate the result to the assessor. The assessor will determine the date, time, and location of the exam.



## B. Challenge exam

The PLAR candidate will successfully complete (50% or higher) a challenge exam assessing learning outcomes 1 and 2. The challenge exam consists of theoretical questions and practical applications. The PLAR candidate is allowed two (2) hours to complete the exam. The assessor will determine the date, time, and location of the exam.

- The exam will cover the CHEM1121 course outcomes related to chemical safety, as follows:
  - A. Implement elements of the Alberta Occupational Health and Safety Act and Workplace Hazardous Materials Information System
    - Explain the importance of WHMIS and safety in the chemistry laboratory.
    - Recognize the various aspects of precautionary labeling including WHMIS and TDG symbols.
    - Identify the different types of personal protective equipment available.
    - Explain regulations pertaining to various types of labels and Occupational Exposure Limits.
  - B. Evaluate workplace hazards and risks when working with flammable materials, corrosive/reactive/toxic materials and compressed gases and recognize the potential for insidious hazards.
    - Explain where the safety features are in the laboratory, examine and apply the safety rules for the laboratory, and identify and select a chemical used in the laboratory by reading its label.
    - Explain how to handle flammable solvents to prevent fires.
    - Explain how to work safely with corrosive chemicals.
    - Identify common biological hazards encountered in the laboratory.
    - Explain the different types of hazards of toxic chemicals and how to monitor and protect oneself from these hazards.
    - Discuss various aspects of compressed gas use, including properties, hazards, precautions, storage and rules for handling.
    - Identify and apply the precautionary measures that must be taken when handling each of the six categories of reactive chemicals.
    - Identify and apply some control measures for working around insidious hazards in the chemical laboratory.

## Resources

- NAIT Chemical Technology YouTube Channel <https://www.youtube.com/user/naitchemtech1>
- Province of Alberta, 2000. *Alberta Occupational Health and Safety Act*, <http://work.alberta.ca/occupational-health-safety/307.html> (accessed June 19, 2014)



### CHEM1132 – General Chemistry

This course provides the student with the basic knowledge and skills required to master inorganic nomenclature; solve calculations involving chemical formulas, chemical equations, solution concentrations, binary mixtures, acid/base and redox titrations and electrochemical cells. The student will also learn about the component parts and applications of electrochemical cells.

The lab portion introduces the students to making observations, recording and determining chemical and physical properties of matter. Students investigate the potentiometric determination of equivalence points, equilibrium constants, Henderson-Hasselbach and the Nernst equation.

**Credit unit(s):** 4.50

**Equivalent course(s):** none

**Prerequisite(s):** none

<b>CHEM1132 – General Chemistry</b> <b>Mastery:</b> I am able to demonstrate it well enough to teach it to someone else. <b>Competent:</b> I can work independently to apply the outcome. <b>Functional:</b> I need some assistance in using the outcome. <b>Learning:</b> I am developing skills and knowledge for this area. <b>None:</b> I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Convert between the name and the chemical formula of inorganic compounds.					
<ul style="list-style-type: none"> <li>Convert between the names and symbols for the first ninety-two elements in the periodic table.</li> </ul>					
<ul style="list-style-type: none"> <li>Distinguish between atoms, ions, molecules and formula units.</li> </ul>					
<ul style="list-style-type: none"> <li>Write chemical formulas using the correct convention based on the compound's name.</li> </ul>					
<ul style="list-style-type: none"> <li>Name binary and ternary ionic compounds, binary covalent compounds, binary acids, ternary acids and hydrates from a chemical formula.</li> </ul>					
<ul style="list-style-type: none"> <li>Identify the cation content of a mixture using qualitative analysis.</li> </ul>					
2. Solve stoichiometry problems associated with chemical formulas.					
<ul style="list-style-type: none"> <li>Use the correct number of significant figures in all calculations and round off calculations to the correct number of significant figures.</li> </ul>					
<ul style="list-style-type: none"> <li>Use and manipulate the SI set of base units and prefixes using the factor-unit method.</li> </ul>					
<ul style="list-style-type: none"> <li>Illustrate data graphically, calculate the slope and interpolate data from the graph.</li> </ul>					
<ul style="list-style-type: none"> <li>Calculate the molar mass of any element or compound.</li> </ul>					
<ul style="list-style-type: none"> <li>Calculate the percentage composition of any element in any compound.</li> </ul>					



<b>CHEM1132 – General Chemistry</b>					
<b>Mastery:</b> I am able to demonstrate it well enough to teach it to someone else.					
<b>Competent:</b> I can work independently to apply the outcome.					
<b>Functional:</b> I need some assistance in using the outcome.					
<b>Learning:</b> I am developing skills and knowledge for this area.					
<b>None:</b> I have no experience with the outcome.					
	<b>Mastery</b>	<b>Competent</b>	<b>Functional</b>	<b>Learning</b>	<b>None</b>
<ul style="list-style-type: none"><li>Calculate the mass present in a given number of moles of a compound and the moles in a given mass of a compound.</li></ul>					
<ul style="list-style-type: none"><li>Calculate the mass of an element in a given mass of a compound.</li></ul>					
<ul style="list-style-type: none"><li>Calculate the number of atoms, molecules or formula units in a given amount of a compound using Avogadro's number.</li></ul>					
<ul style="list-style-type: none"><li>Calculate the empirical and molecular formulas of a compound given either the percentage composition or the masses of the elements in the compound.</li></ul>					
<b>3. Solve stoichiometry problems associated with chemical reactions.</b>					
<ul style="list-style-type: none"><li>Predict the reaction type and products for the following types of chemical reactions: synthesis, decomposition, single replacement, double replacement and combustion.</li></ul>					
<ul style="list-style-type: none"><li>Manipulate the coefficients of a reaction by inspection to produce a balanced chemical reaction.</li></ul>					
<ul style="list-style-type: none"><li>Convert a balanced chemical equation into a total ionic equation and a net ionic equation.</li></ul>					
<ul style="list-style-type: none"><li>Solve calculations that convert between moles, mass and volume for gases at STP, pure liquids, and solids for any balanced chemical equation.</li></ul>					
<ul style="list-style-type: none"><li>Solve limiting reagent problems.</li></ul>					
<b>4. Calculate solution concentrations and prepare solutions.</b>					
<ul style="list-style-type: none"><li>Define and calculate solution concentrations in percent, ppm, ppb, molality, mole fraction, molarity and normality.</li></ul>					
<ul style="list-style-type: none"><li>Calculate the amount of each component in a solution from the amount and concentration of a solution.</li></ul>					
<ul style="list-style-type: none"><li>Convert from one solution concentration unit into another for a particular mixture.</li></ul>					
<ul style="list-style-type: none"><li>Solve problems involving the preparation of dilute solutions.</li></ul>					
<ul style="list-style-type: none"><li>Solve neutralization problems including titrations using molarities and normalities.</li></ul>					
<b>5. Solve gravimetric analysis problems and analyze samples using gravimetric analysis.</b>					
<ul style="list-style-type: none"><li>Solve problems using gravimetric factors.</li></ul>					



<b>CHEM1132 – General Chemistry</b> <b>Mastery:</b> I am able to demonstrate it well enough to teach it to someone else. <b>Competent:</b> I can work independently to apply the outcome. <b>Functional:</b> I need some assistance in using the outcome. <b>Learning:</b> I am developing skills and knowledge for this area. <b>None:</b> I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
<ul style="list-style-type: none"> <li>Solve percent purity problems.</li> </ul>					
6. Solve problems associated with electrochemical cells.					
<ul style="list-style-type: none"> <li>Identify the species oxidized and reduced and the oxidizing and reducing agents in a chemical reaction using oxidation numbers.</li> </ul>					
<ul style="list-style-type: none"> <li>Define and calculate the number of equivalents in a given quantity of material in a given redox reaction and calculate the equivalent mass.</li> </ul>					
<ul style="list-style-type: none"> <li>Calculate the normality of solutions involved in a specific redox reaction from the amount of each component in the solution.</li> </ul>					
<ul style="list-style-type: none"> <li>Calculate the amount of solute present in a solution, given the normality and volume of the solution for solutions used in redox reactions.</li> </ul>					
<ul style="list-style-type: none"> <li>Apply the steps necessary to obtain a balanced redox equation using the oxidation number method and the half-reaction method.</li> </ul>					
<ul style="list-style-type: none"> <li>Draw and label the parts of an electrochemical cell including the electrodes, electrolyte(s), salt bridge and the external circuit.</li> </ul>					
<ul style="list-style-type: none"> <li>Differentiate between electrolytic and galvanic/voltaic cells.</li> </ul>					
<ul style="list-style-type: none"> <li>Describe applications of electrolytic cells in industry.</li> </ul>					
<ul style="list-style-type: none"> <li>Solve problems involving Faraday's Law. Apply Faraday's Law to electroplate copper.</li> </ul>					
<ul style="list-style-type: none"> <li>Describe and interpret electrochemical cell data in the standard format.</li> </ul>					
<ul style="list-style-type: none"> <li>Write half-cell reactions for a given cell and calculate the cell potentials under standard conditions.</li> </ul>					
<ul style="list-style-type: none"> <li>Determine if a given redox reaction is spontaneous.</li> </ul>					
<ul style="list-style-type: none"> <li>Apply the Nernst equation to calculate cell potentials where concentrations differ from standard conditions. Measure the cell potential on redox solutions containing different concentrations of electrolyte.</li> </ul>					
<ul style="list-style-type: none"> <li>Explain redox reactions associated with corrosion and describe methods for protecting metals against corrosion.</li> </ul>					
<ul style="list-style-type: none"> <li>Define and give examples of primary voltaic cells, secondary voltaic cells and fuel cells.</li> </ul>					



## PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. If both exams are used, the relative weighting is indicated below. Be prepared to discuss the expectations during a consultation meeting.

### A. Lab Practical Exam (40%)

- The PLAR candidate will successfully complete (50% or higher) a two (2) hour laboratory practical exam.
- The PLAR candidate will perform an acid-base titration to correctly determine the concentration of a NaOH solution.
- The evaluation of the practical exam will be based on laboratory technique (50%) and achieving the correct determination of the NaOH concentration of the solution (50%).
- The practical exam will be administered in a Chemical Technology laboratory by authorized evaluator(s) who will evaluate the PLAR candidate and communicate the result to the assessor. The assessor will determine the date, time, and location of the exam.

### B. Theory Challenge Exam (60%)

- The PLAR candidate will successfully complete (50% or higher) a theory challenge exam assessing learning outcomes 1 to 6. The challenge exam consists of nomenclature, calculations, short answer and drawing questions. Answers to calculations must contain the correct number of significant figures.
- The PLAR candidate is allowed three (3) hours to complete the exam. The assessor will determine the date, time and location of the exam.
- The theory challenge exam will cover the CHEM1132 course outcomes as follows:
  - A. Convert between the name and chemical formula of inorganic compounds.
    - Convert between the names and symbols for the first ninety-two elements in the periodic table.
    - Distinguish between atoms, ions, molecules and formula units.
    - Write chemical formulas using the correct convention based on the compound's name.
    - Name binary and ternary ionic compounds, binary covalent compounds, binary acids, ternary acids and hydrates from a chemical formula.
  - B. Solve stoichiometry problems associated with chemical formulas.
    - Use the correct number of significant figures in all calculations and round off calculations to the correct number of significant figures.
    - Use and manipulate the SI set of base units and prefixes using the factor-unit method.
    - Illustrate data graphically, calculate the slope and interpolate data from the graph.
    - Calculate the molar mass of any element or compound.
    - Calculate the percentage composition of any element in any compound.
    - Calculate the mass present in a given number of moles of a compound and the moles in a given mass of a compound.
    - Calculate the mass of an element in a given mass of a compound.
    - Calculate the number of atoms, molecules or formula units in a given amount of a compound using Avogadro's number.
    - Calculate the empirical and molecular formulas of a compound given either the percentage composition or the masses of the elements in the compound.



- C. Solve stoichiometry problems associated with chemical reactions.
- Predict the reaction type and products for the following types of chemical reactions: synthesis, decomposition, single replacement, double replacement and combustion.
  - Manipulate the coefficients of a reaction by inspection to produce a balanced chemical reaction.
  - Convert a balanced chemical equation into a total ionic equation and a net ionic equation.
  - Solve calculations that convert between moles, mass and volume for gases at STP, pure liquids, and solids for any balanced chemical equation.
  - Solve limiting reagent problems.
- D. Calculate solution concentrations and prepare solutions.
- Define and calculate solution concentrations in percent, ppm, ppb, molality, mole fraction, molarity and normality.
  - Calculate the amount of each component in a solution from the amount and concentration of a solution.
  - Convert from one solution concentration unit into another for a particular mixture.
  - Solve problems involving the preparation of dilute solutions.
  - Solve neutralization problems including titrations using molarities and normalities.
- E. Solve gravimetric analysis problems and analyze samples using gravimetric analysis.
- Solve problems using gravimetric factors.
  - Solve percent purity problems.
- F. Solve problems associated with electrochemical cells.
- Identify the species oxidized and reduced and the oxidizing and reducing agents in a chemical reaction using oxidation numbers.
  - Define and calculate the number of equivalents in a given quantity of material in a given redox reaction and calculate the equivalent mass.
  - Calculate the normality of solutions involved in a specific redox reaction from the amount of each component in the solution.
  - Calculate the amount of solute present in a solution, given the normality and volume of the solution for solutions used in redox reactions.
  - Apply the steps necessary to obtain a balanced redox equation using the oxidation number method and the half-reaction method.
  - Draw and label the parts of an electrochemical cell including the electrodes, electrolyte(s), salt bridge and the external circuit.
  - Differentiate between electrolytic and galvanic/voltaic cells.
  - Describe applications of electrolytic cells in industry.
  - Solve problems involving Faraday's Law.
  - Describe and interpret electrochemical cell data in the standard format.
  - Write half-cell reactions for a given cell and calculate the cell potentials under standard conditions.
  - Determine if a given redox reaction is spontaneous.
  - Apply the Nernst equation to calculate cell potentials where concentrations differ from standard conditions.
  - Explain redox reactions associated with corrosion and describe methods for protecting metals against corrosion.
  - Define and give examples of primary voltaic cells, secondary voltaic cells and fuel cells.



### PMGT2390B – Project Management

This course is designed to develop skills in project management using literature searches, budgeting, purchasing, experimental design, and reporting of results. Quality management and teamwork will be emphasized. The final results of the project are presented in written form and orally to an audience. A number of advanced safety topics will be addressed and these topics will be woven in with the Project Management component wherever possible. The ethics component will assist students in recognizing ethical issues in their professional lives and to examine possible solutions to real-world ethical issues. Some industry-relevant Quality Assurance models will also be examined.

**Credit unit(s):** 4.50

**Equivalent course(s):** none

**Prerequisite(s):** PMGT2390A

<b>PMGT2390B – Project Management</b> <b>Mastery:</b> I am able to demonstrate it well enough to teach it to someone else. <b>Competent:</b> I can work independently to apply the outcome. <b>Functional:</b> I need some assistance in using the outcome. <b>Learning:</b> I am developing skills and knowledge for this area. <b>None:</b> I have no experience with the outcome.	<b>Mastery</b>	<b>Competent</b>	<b>Functional</b>	<b>Learning</b>	<b>None</b>
1. Plan and execute activities to make the most efficient use of the available time and equipment.					
• Performs literature research by searching online databases, library and internet resources.					
• Obtains and analyzes citations and published research articles.					
• Prepares a research project proposal.					
• Prepares and/or follows a project timeline.					
• Prepares and/or follows a project budget.					
• Completes hazard assessments.					
2. Design and conduct experiments to complete a technical or research project.					
• Plans experimental work.					
• Demonstrates troubleshooting skills.					
• Prepares a standard operating procedure (SOP).					
• Meets appropriate standards for laboratory performance.					



<b>PMGT2390B – Project Management</b>		<b>Mastery</b>	<b>Competent</b>	<b>Functional</b>	<b>Learning</b>	<b>None</b>
<b>Mastery:</b>	I am able to demonstrate it well enough to teach it to someone else.					
<b>Competent:</b>	I can work independently to apply the outcome.					
<b>Functional:</b>	I need some assistance in using the outcome.					
<b>Learning:</b>	I am developing skills and knowledge for this area.					
<b>None:</b>	I have no experience with the outcome.					
3. Monitor the progress of a project.						
• Produces periodic progress reports.						
• Maintains complete and accurate laboratory documentation.						
4. Produce a technical report and group oral presentation based on the literature review and experimental work.						
• Produces a final technical report on research project.						
• Prepares a project cost analysis.						
• Presents an oral presentation outlining the results of the research project.						

### PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

- Evidence file** (May require an interview with the Assessor for clarification of evidence)
  - Successful completion of PMGT2390A. This can be confirmed by the program.
  - A **personal resume** detailing the relevant work history of the candidate.
  - **Description of a research project** performed including methods and/or instrumentation used.
  - Copy of **research report** prepared during work experience or graduate studies.
  - Copy of slides used for **oral presentation** prepared during work experience or graduate studies.
  - If applicable, evidence of completion of a research-based graduate thesis that included an oral presentation (e.g. graduate thesis defense) (Outcome 5-6).
  - **Employer validation checklist** (validated by the employer)\*.

\* Employer validation checklist will be provided to candidate at PLAR audit meeting with program.



A LEADING POLYTECHNIC  
COMMITTED TO STUDENT SUCCESS

## Appendix A: Title Page

# Chemical Technology

ABCD 1234 – Course Name

Student name

Date



## Appendix B: Employer Validation Letter

### Prior Learning Assessment and Recognition

**Instructions:** The employment validation letter provides a statement of verification of employment in a setting relevant to the course(s) being challenged through PLAR. The employment validation letter must be printed on letterhead of your current employer and signed by the human resources department indicating the length of employment and working environment(s). A letter template has been provided for your use. Please copy the content below and fill-in the fields as directed. The completed letter should be included with your PLAR evidence and submitted to the PLAR assessor for the Chemical Technology program.

**Letter template** (On employer's business letterhead)

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Date

To Whom It May Concern:

I have reviewed the employment records of \_\_\_\_\_ and  
Name of employee/candidate

I can verify that the above candidate has been employed by \_\_\_\_\_  
Name of employer

for \_\_\_\_\_  
Length of employment

Please contact me at \_\_\_\_\_ or \_\_\_\_\_  
Phone email

with any questions or for additional information.

Sincerely,

\_\_\_\_\_  
Name

\_\_\_\_\_  
Job title

\_\_\_\_\_  
Signature



A LEADING POLYTECHNIC  
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## Appendix C: Evidence Binder Cover Page

**Evidence File for:** \*Insert Course Name\*

**Program Name:** Chemical Technology

**Student Name:**

**Address:**

**City:**

**Phone:**

**Fax:**

**Email:**

**NAIT Student ID:**

**I attest that the enclosed evidence are correct and have been compiled by myself. I attest that I am the person named in this application and the evidence unless otherwise signified.**

Signature: \_\_\_\_\_

Date: \_\_\_\_\_